

AMENDMENTS TO THE CLAIMS

Please amend Claims 14, 15, 17, 21, 22, and 25, and add new Claims 139 through 174 to read as follows. Note that all the claims currently pending in this application, including those not presently being amended, have been reproduced below for the Examiner's convenience.

13. (Previously Amended) An exposure apparatus, comprising:

first exposure means for illuminating a predetermined mask with light of a predetermined wavelength under a first mask-illumination condition, to print a first pattern on a predetermined exposure region; and

second exposure means for illuminating the predetermined mask with light of the predetermined wavelength under a second mask-illumination condition, different from the first mask-illumination condition, to print a second pattern on the predetermined exposure region,

wherein a first exposure by said first exposure means and a second exposure by said second exposure means are carried out prior to a development process.

14. (Currently Amended) An exposure apparatus according to Claim 13, wherein, under the first mask-illumination condition, the predetermined mask is illuminated with a first sigma, and, under the ~~second-mask illumination~~ second mask-illumination condition, the predetermined mask is illuminated with a second sigma, different from the first sigma.

15. (Currently Amended) An exposure apparatus according to Claim 13, wherein under the first mask-illumination condition, the predetermined mask is illuminated with a first numerical aperture, and, under the second mask-illumination condition, the predetermined mask is illuminated with a second numerical aperture, different from the first numerical aperture.

16. (Previously Amended) An exposure apparatus according to Claim 13, wherein, under the first mask-illumination condition, the predetermined mask is illuminated with light being obliquely incident thereon, and, under the second mask-illumination condition, the predetermined mask is illuminated with light being perpendicularly incident thereon.

17. (Currently Amended) An apparatus according to ~~any one of Claims 13-16~~ Claim 13, wherein the mask includes an opening pattern with a linewidth not greater than a resolution limit of an exposure apparatus to be used.

18. (Original) An apparatus according to Claim 17, wherein there are plural opening patterns juxtaposed with each other.

19. (Previously Amended) An apparatus according to Claim 17, wherein the mask includes a phase shift pattern.

20. (Previously Amended) An apparatus according to Claim 17, wherein there is a desired pattern and an auxiliary pattern having a shape different from that of a repetition of the desired pattern, disposed adjacent to the mask.

21. (Currently Amended) An apparatus according to ~~any one of Claims 13-16~~ Claim 13, wherein the mask is illuminated with light from one of a KrF excimer laser, an ArF excimer laser and an F₂ excimer laser.

22. (Currently Amended) An apparatus according to ~~any one of Claims 13-16~~ Claim 13, wherein the mask is projected by use of a projection optical system comprising one of a dioptric system, a catadioptric system and a catoptric system.

23. (Previously Amended) An apparatus according to any one of Claims 13 - 16, wherein the exposure wavelength of said first exposure means and the exposure wavelength of said second exposure means are substantially the same.

24. (Previously Amended) An apparatus according to any one of Claims 13 - 16, wherein exposures of the exposure region under different illumination conditions are performed simultaneously without interference of lights in the different illumination conditions.

25. (Currently Amended) A device manufacturing method, comprising the steps of:

exposing a wafer to a pattern on a mask by use of an exposure apparatus as recited in ~~any one of Claims 13-16~~ Claim 13; and

developing the exposed wafer.

38. (Previously Amended) An exposure apparatus comprising:
an illumination optical system for illuminating a predetermined mask;
a projection optical system for projecting light from the mask to a predetermined exposure region;

first exposure means for illuminating the mask under a first illumination condition and for projecting light from the mask to the exposure region at a first spatial frequency passage spectrum of the projection system, so that the exposure region is exposed with a second pattern; and

second exposure means for illuminating the mask under a second illumination condition, different from the first illumination condition, and for projecting light from the mask to the exposure region at a second spatial frequency passage spectrum of the projection system, different from the first spatial frequency passage spectrum, so that the exposure region is exposed with a second pattern,

wherein a first exposure by said first exposure means and a second exposure by said second exposure means are carried out prior to a development process.

39. (Previously Amended) An exposure apparatus comprising:
an illumination optical system for illuminating a predetermined mask;
a projection optical system for projecting light from the mask to a
predetermined exposure region;

first exposure means for illuminating the mask with a first sigma and for
projecting light from the mask to the exposure region at a first spatial frequency passage
spectrum of the projection system, so that the exposure region is exposed with a first pattern; and

second exposure means for illuminating the mask with a second sigma,
different from the first sigma, and for projecting light from the mask to the exposure region at a
second spatial frequency passage spectrum of the projection system, different from the first
spatial frequency passage spectrum, so that the exposure region is exposed with a second pattern,

wherein a first exposure by said first exposure means and a second exposure
by said second exposure means are carried out prior to a development process.

40. (Previously Amended) An exposure apparatus comprising:
an illumination optical system for illuminating a predetermined mask;
a projection optical system for projecting light from the mask to a
predetermined exposure region;

first exposure means for illuminating the mask with a first numerical
aperture and for projecting light from the mask to the exposure region at a first spatial

frequency passage spectrum of the projection system, so that the exposure region is exposed with a first pattern; and

second exposure means for illuminating the mask with a second numerical aperture, different from the first numerical aperture, and for projecting light from the mask to the exposure region at a second spatial frequency passage spectrum of the projection system, different from the first spatial frequency passage spectrum, so that the exposure region is exposed with a second pattern,

wherein a first exposure by said first exposure means and a second exposure by said second exposure means are carried out prior to a development process.

41. (Previously Amended) An exposure apparatus comprising:
an illumination optical system for illuminating a predetermined mask;
a projection optical system for projecting light from the mask to a
predetermined exposure region;

first exposure means for obliquely illuminating the mask and for projecting light from the mask to the exposure region at a first spatial frequency passage spectrum of the projection system, so that the exposure region is exposed with a first pattern; and

second exposure means for perpendicularly illuminating the mask and for projecting light from the mask to the exposure region at a second spatial frequency passage spectrum of the projection system, different from the first spatial frequency passage spectrum, so that the exposure region is exposed with a second pattern,

wherein a first exposure by said first exposure means and a second exposure by said second exposure means are carried out prior to a development process.

42. (Previously Amended) An apparatus according to any one of Claims 38 - 41, wherein the mask includes an opening pattern with a linewidth not greater than a resolution limit of an exposure apparatus to be used.

43. (Original) An apparatus according to Claim 42, wherein there are plural opening patterns juxtaposed with each other.

44. (Previously Amended) An apparatus according to Claim 42, wherein the mask includes a phase shift pattern.

45. (Previously Amended) An apparatus according to any one of Claims 38 - 41, wherein one of a shape of an aperture opening of the projection optical system and a transmission factor distribution is changed to change the spatial frequency passage spectrum of the projection optical system.

46. (Previously Amended) An apparatus according to any one of Claims 38 - 41, wherein the mask is illuminated with light from one of a KrF excimer laser, an ArF excimer laser and an F₂ excimer laser.

47. (Previously Amended) An apparatus according to any one of Claims 38 - 41, wherein the mask is projected by use of a projection optical system comprising one of a dioptric system, a catadioptric system and a catoptric system.

48. (Previously Amended) An apparatus according to any one of Claims 38 - 41, wherein the exposure wavelength of said first exposure means and the exposure wavelength of said second exposure means are substantially the same.

49. (Previously Amended) An apparatus according to any one of Claims 38 - 41, wherein exposures of the exposure region under different illumination conditions are performed simultaneously without interference of lights in the different illumination conditions.

50. (Previously Amended) A device manufacturing method, comprising the steps of:

exposing a wafer to a pattern on a mask by use of an exposure apparatus as recited in any one of Claims 38 - 41; and

developing the exposed wafer.

63. (Previously Amended) An exposure apparatus, comprising:

first exposure means for illuminating a predetermined mask with light of a predetermined wavelength under a first illumination condition, to print a first pattern on a predetermined exposure region; and

second exposure means for illuminating the mask with light of the predetermined wavelength under a second illumination condition, different from the first illumination condition, to print a second pattern on the predetermined exposure region,

wherein the mask has a desired pattern and an auxiliary pattern having a shape different from that of a repetition of the desired pattern, and

wherein a first exposure by said first exposure means and a second exposure by said second exposure means are carried out prior to a development process.

64. (Previously Amended) An exposure apparatus, comprising:

first exposure means for illuminating a predetermined mask with light of a first sigma, to print a first pattern on a predetermined exposure region; and

second exposure means for illuminating the mask with light of a second sigma, different from the first sigma, to print a second pattern on the predetermined exposure region,

wherein the mask has a desired pattern and an auxiliary pattern having a shape different from that of a repetition of the desired pattern, and

wherein a first exposure by said first exposure means and a second exposure by said second exposure means are carried out prior to a development process.

65. (Previously Amended) An exposure apparatus, comprising:

first exposure means for illuminating a predetermined mask with light of a first numerical aperture, to print a first pattern on a predetermined exposure region; and
second exposure means for illuminating the mask with light of a second numerical aperture, different from the first numerical aperture, to print a second pattern on the predetermined exposure region,

wherein the mask has a desired pattern and an auxiliary pattern having a shape different from that of a repetition of the desired pattern, and

wherein a first exposure by said first exposure means and a second exposure by said second exposure means are carried out prior to a development process.

66. (Previously Amended) An exposure apparatus, comprising:

first exposure means for obliquely illuminating a predetermined mask, to print a first pattern on a predetermined exposure region; and

second exposure means for perpendicularly illuminating the mask to print a second pattern on the predetermined exposure region,

wherein the mask has a desired pattern and an auxiliary pattern having a shape different from that of a repetition of the desired pattern, and

wherein a first exposure by said first exposure means and a second exposure by said second exposure means are carried out prior to a development process.

67. (Previously Amended) An apparatus according to any one of Claims 63 - 66, wherein the mask includes an opening pattern with a linewidth not greater than a resolution limit of an exposure apparatus to be used.

68. (Original) An apparatus according to Claim 67, wherein there are plural opening patterns juxtaposed with each other.

69. (Previously Amended) An apparatus according to Claim 67, wherein the mask includes a phase shift pattern.

70. (Original) An apparatus according to Claim 67, wherein there is an auxiliary pattern disposed adjacent to the opening pattern.

71. (Previously Amended) An apparatus according to any one of Claims 63 - 66, wherein the mask is illuminated with light from one of a KrF excimer laser, an ArF excimer laser and an F₂ excimer laser.

72. (Previously Amended) An apparatus according to any one of Claims 63 - 66, wherein the mask is projected by use of a projection optical system comprising one of a dioptric system, a catadioptric system and a catoptric system.

73. (Previously Amended) An apparatus according to any one of Claims 63 - 66, wherein the exposure wavelength of said first exposure means and the exposure wavelength of said second exposure means are substantially the same.

74. (Previously Amended) An apparatus according to any one of Claims 63 - 66, wherein exposures of the exposure region under different illumination conditions are performed simultaneously without mutual interference of lights in the different illumination conditions.

75. (Previously Amended) A device manufacturing method, comprising the steps of:

exposing a wafer to a pattern on a mask by use of an exposure apparatus as recited in any one of Claims 63 - 66; and

developing the exposed wafer.

83. (Previously Amended) An exposure apparatus comprising:
an illumination optical system for illuminating a predetermined mask;
a projection optical system for projecting light from the mask to a
predetermined exposure region;

first exposure means for illuminating the mask under a first illumination
condition and for projecting light from the mask to the exposure region at a first spatial
frequency passage spectrum of the projection system, so that the exposure region is exposed
with a first pattern; and

second exposure means for illuminating the mask under a second
illumination condition, different from the first illumination condition, and for projecting light
from the mask to the exposure region at a second spatial frequency passage spectrum of the
projection system, different from the first spatial frequency passage spectrum, so that the
exposure region is exposed with a second pattern,

wherein the mask has a repetition pattern comprising repeatedly disposed
basic patterns, being defined by light transmissive portions,

wherein light passed through adjacent basic patterns of the repetition
pattern have a mutual optical phase difference of about 180 deg., and

wherein a first exposure by said first exposure means and a second exposure
by said second exposure means are carried out prior to a development process.

85. (Previously Amended) An exposure apparatus according to Claim 83, wherein the basic pattern comprises a pair of transmissive patterns, and corresponding light transmissive portions of the pair of transmissive patterns have a mutual optical phase difference of about 180 deg.

86. (Previously Added) An exposure apparatus according to Claim 83, wherein, as one illumination condition, approximately coherent illumination with a small effective light source is used.

87. (Previously Added) An exposure apparatus according to Claim 83, wherein one light passage condition of the pupil plane of the projection optical system is limiting a passage region by use of an aperture stop having an elongated opening, extending in a direction in which pattern resolution is high.

88. (Previously Amended) An exposure apparatus according to Claim 83, wherein the illumination condition is changed upon switching of multiple exposures by use of illumination stop holding means having plural illumination stops, one of which can be detachably inserted into a light path of the illumination optical system.

89. (Previously Amended) An exposure apparatus according to Claim 83, wherein there are a light blocking plate having at least one opening and holding means for the light blocking plate, and the illumination condition is changed by use of light blocking plate rotating means for rotationally moving the light blocking plate within the illumination optical system, upon switching of the multiple exposures.

90. (Previously Amended) An apparatus according to Claim 83, wherein said first exposure means illuminates the mask with a first sigma, and said second exposure means illuminates the mask with a second sigma, different from the first sigma.

91. (Previously Amended) An apparatus according to Claim 83, wherein said first exposure means illuminates the mask with a first numerical aperture, and said second exposure means illuminates the mask with a second numerical aperture, different from the first numerical aperture.

92. (Previously Amended) An apparatus according to Claim 83, wherein said first exposure means illuminates the mask obliquely, and said second exposure means illuminates the mask perpendicularly.

93. (Previously Amended) An apparatus according to Claim 83, wherein the mask includes an opening pattern with a linewidth not greater than a resolution limit of an exposure apparatus to be used.

94. (Previously Amended) An apparatus according to Claim 83, wherein a desired pattern and an auxiliary pattern having a shape different from that of a repetition of the desired pattern, are disposed adjacent to a pattern on the mask.

95. (Previously Amended) An apparatus according to Claim 83, wherein the mask is illuminated with light from one of a KrF excimer laser, an ArF excimer laser and an F₂ excimer laser.

96. (Previously Amended) An apparatus according to Claim 83, wherein the mask is projected by use of a projection optical system comprising one of a dioptric system, a catadioptric system and a catoptric system.

97. (Previously Added) An apparatus according to Claim 83, wherein the exposure wavelength of said first exposure means and the exposure wavelength of said second exposure means are substantially the same.

98. (Previously Added) An apparatus according to Claim 83, wherein exposures of the exposure region under different illumination conditions are performed simultaneously without interference of lights in the different illumination conditions.

99. (Previously Amended) A device manufacturing method, comprising the steps of:

exposing a wafer to a pattern on a mask by use of an exposure apparatus as recited in Claim 83; and
developing the exposed wafer.

100. (Previously Amended) An apparatus according to Claim 13, wherein the illumination of the mask is performed with bright field illumination.

101. (Previously Amended) An apparatus according to Claim 14, wherein the illumination of the mask is performed with bright field illumination.

102. (Previously Amended) An apparatus according to Claim 15, wherein the illumination of the mask is performed with bright field illumination.

103. (Previously Amended) An apparatus according to Claim 16, wherein the illumination of the mask is performed with bright field illumination.

104. (Previously Amended) An apparatus according to Claim 38,
wherein the illumination of the mask is performed with bright field illumination.

105. (Previously Amended) An apparatus according to Claim 39,
wherein the illumination of the mask is performed with bright field illumination.

106. (Previously Amended) An apparatus according to Claim 40,
wherein the illumination of the mask is performed with bright field illumination.

107. (Previously Amended) An apparatus according to Claim 41,
wherein the illumination of the mask is performed with bright field illumination.

108. (Previously Amended) An apparatus according to Claim 63,
wherein the illumination of the mask is performed with bright field illumination.

109. (Previously Amended) An apparatus according to Claim 64,
wherein the illumination of the mask is performed with bright field illumination.

110. (Previously Amended) An apparatus according to Claim 65,
wherein the illumination of the mask is performed with bright field illumination.

111. (Previously Amended) An apparatus according to Claim 66,
wherein the illumination of the mask is performed with bright field illumination.

112. (Previously Amended) An apparatus according to Claim 83,
wherein the illumination of the mask is performed with bright field illumination.

113. (Previously Added) An apparatus according to Claim 13, wherein
the exposure by said first exposure means produces a first region in which an exposure
amount does not reach an exposure threshold value, while the exposure by said second
exposure means produces a second region in which an exposure amount does not reach the
exposure threshold value, and wherein the exposure threshold value is reached in at least a
portion of the first and second regions as superposed with each other.

114. (Previously Added) An apparatus according to Claim 14, wherein
the exposure by said first exposure means produces a first region in which an exposure
amount does not reach an exposure threshold value, while the exposure by said second
exposure means produces a second region in which an exposure amount does not reach the
exposure threshold value, and wherein the exposure threshold value is reached in at least a
portion of the first and second regions as superposed with each other.

115. (Previously Added) An apparatus according to Claim 15, wherein the exposure by said first exposure means produces a first region in which an exposure amount does not reach an exposure threshold value, while the exposure by said second exposure means produces a second region in which an exposure amount does not reach the exposure threshold value, and wherein the exposure threshold value is reached in at least a portion of the first and second regions as superposed with each other.

116. (Previously Added) An apparatus according to Claim 16, wherein the exposure by said first exposure means produces a first region in which an exposure amount does not reach an exposure threshold value, while the exposure by said second exposure means produces a second region in which an exposure amount does not reach the exposure threshold value, and wherein the exposure threshold value is reached in at least a portion of the first and second regions as superposed with each other.

117. (Previously Added) An apparatus according to Claim 38, wherein the exposure by said first exposure means produces a first region in which an exposure amount does not reach an exposure threshold value, while the exposure by said second exposure means produces a second region in which an exposure amount does not reach the exposure threshold value, and wherein the exposure threshold value is reached in at least a portion of the first and second regions as superposed with each other.

118. (Previously Added) An apparatus according to Claim 39, wherein the exposure by said first exposure means produces a first region in which an exposure amount does not reach an exposure threshold value, while the exposure by said second exposure means produces a second region in which an exposure amount does not reach the exposure threshold value, and wherein the exposure threshold value is reached in at least a portion of the first and second regions as superposed with each other.

119. (Previously Added) An apparatus according to Claim 40, wherein the exposure by said first exposure means produces a first region in which an exposure amount does not reach an exposure threshold value, while the exposure by said second exposure means produces a second region in which an exposure amount does not reach the exposure threshold value, and wherein the exposure threshold value is reached in at least a portion of the first and second regions as superposed with each other.

120. (Previously Added) An apparatus according to Claim 41, wherein the exposure by said first exposure means produces a first region in which an exposure amount does not reach an exposure threshold value, while the exposure by said second exposure means produces a second region in which an exposure amount does not reach the exposure threshold value, and wherein the exposure threshold value is reached in at least a portion of the first and second regions as superposed with each other.

121. (Previously Added) An apparatus according to Claim 63, wherein the exposure by said first exposure means produces a first region in which an exposure amount does not reach an exposure threshold value, while the exposure by said second exposure means produces a second region in which an exposure amount does not reach the exposure threshold value, and wherein the exposure threshold value is reached in at least a portion of the first and second regions as superposed with each other.

122. (Previously Added) An apparatus according to Claim 64, wherein the exposure by said first exposure means produces a first region in which an exposure amount does not reach an exposure threshold value, while the exposure by said second exposure means produces a second region in which an exposure amount does not reach the exposure threshold value, and wherein the exposure threshold value is reached in at least a portion of the first and second regions as superposed with each other.

123. (Previously Added) An apparatus according to Claim 65, wherein the exposure by said first exposure means produces a first region in which an exposure amount does not reach an exposure threshold value, while the exposure by said second exposure means produces a second region in which an exposure amount does not reach the exposure threshold value, and wherein the exposure threshold value is reached in at least a portion of the first and second regions as superposed with each other.

124. (Previously Added) An apparatus according to Claim 66, wherein the exposure by said first exposure means produces a first region in which an exposure amount does not reach an exposure threshold value, while the exposure by said second exposure means produces a second region in which an exposure amount does not reach the exposure threshold value, and wherein the exposure threshold value is reached in at least a portion of the first and second regions as superposed with each other.

125. (Previously Added) An apparatus according to Claim 83, wherein the exposure by said first exposure means produces a first region in which an exposure amount does not reach an exposure threshold value, while the exposure by said second exposure means produces a second region in which an exposure amount does not reach the exposure threshold value, and wherein the exposure threshold value is reached in at least a portion of the first and second regions as superposed with each other.

126. (Previously Added) An apparatus according to Claim 13, wherein the first and second patterns have different shapes.

127. (Previously Added) An apparatus according to Claim 14, wherein the first and second patterns have different shapes.

128. (Previously Added) An apparatus according to Claim 15, wherein the first and second patterns have different shapes.

129. (Previously Added) An apparatus according to Claim 16, wherein the first and second patterns have different shapes.

130. (Previously Added) An apparatus according to Claim 38, wherein the first and second patterns have different shapes.

131. (Previously Added) An apparatus according to Claim 39, wherein the first and second patterns have different shapes.

132. (Previously Added) An apparatus according to Claim 40, wherein the first and second patterns have different shapes.

133. (Previously Added) An apparatus according to Claim 41, wherein the first and second patterns have different shapes.

134. (Previously Added) An apparatus according to Claim 63, wherein the first and second patterns have different shapes.

135. (Previously Added) An apparatus according to Claim 64, wherein the first and second patterns have different shapes.

136. (Previously Added) An apparatus according to Claim 65, wherein the first and second patterns have different shapes.

137. (Previously Added) An apparatus according to Claim 66, wherein the first and second patterns have different shapes.

138. (Previously Added) An apparatus according to Claim 83, wherein the first and second patterns have different shapes.

139. (New) An exposure apparatus, comprising:

first exposure means for illuminating a predetermined mask with light of a predetermined wavelength under a first mask-illumination condition, to print a first pattern on a predetermined exposure region; and

second exposure means for illuminating the predetermined mask with light of the predetermined wavelength under a second mask-illumination condition, to print a second pattern on the predetermined exposure region,

wherein a first exposure by said first exposure means and a second exposure by said second exposure means are carried out prior to a development process, and

wherein exposures with said first and second exposure means are carried out simultaneously.

140. (New) An apparatus according to Claim 139, wherein the light used by said first exposure means for illumination of the predetermined mask and the light used by said second exposure means for illumination of the predetermined mask have substantially mutually orthogonal polarization directions.

141. (New) An exposure apparatus according to Claim 139, wherein, under the first mask-illumination condition, the predetermined mask is illuminated with a first sigma, and, under the second mask-illumination condition, the predetermined mask is illuminated with a second sigma, different from the first sigma.

142. (New) An exposure apparatus according to Claim 139, wherein under the first mask-illumination condition, the predetermined mask is illuminated with a first numerical aperture, and, under the second mask-illumination condition, the predetermined mask is illuminated with a second numerical aperture, different from the first numerical aperture.

143. (New) An exposure apparatus according to Claim 139, wherein, under the first mask-illumination condition, the predetermined mask is illuminated with light

being obliquely incident thereon, and, under the second mask-illumination condition, the predetermined mask is illuminated with light being perpendicularly incident thereon.

144. (New) An apparatus according to Claim 139, wherein the mask includes an opening pattern with a linewidth not greater than a resolution limit of an exposure apparatus to be used.

145. (New) An apparatus according to Claim 144, wherein there are plural opening patterns juxtaposed with each other.

146. (New) An apparatus according to Claim 144, wherein the mask includes a phase shift pattern.

147. (New) An apparatus according to Claim 144, wherein there is a desired pattern and an auxiliary pattern having a shape different from that of a repetition of the desired pattern, disposed adjacent to the mask.

148. (New) An apparatus according to Claim 139, wherein the mask is illuminated with light from one of a KrF excimer laser, an ArF excimer laser and an F₂ excimer laser.

149. (New) An apparatus according to Claim 139, wherein the mask is projected by use of a projection optical system comprising one of a dioptric system, a catadioptric system and a catoptric system.

150. (New) An apparatus according to Claim 139, wherein the exposure wavelength of said first exposure means and the exposure wavelength of said second exposure means are substantially the same.

151. (New) An apparatus according to Claim 139, wherein exposures of the exposure region under different illumination conditions are performed simultaneously without interference of lights in the different illumination conditions.

152. (New) An apparatus according to Claim 139, wherein the illumination of the mask is performed with bright field illumination.

153. (New) An apparatus according to Claim 139, wherein the exposure by said first exposure means produces a first region in which an exposure amount does not reach an exposure threshold value, while the exposure by said second exposure means produces a second region in which an exposure amount does not reach the exposure threshold value, and wherein the exposure threshold value is reached in at least a portion of the first and second regions as superposed with each other.

154. (New) An apparatus according to Claim 139, wherein the first and second patterns have different shapes.

155. (New) A device manufacturing method, comprising the steps of:
exposing a wafer to a pattern on a mask by use of an exposure apparatus as recited in Claim 139; and
developing the exposed wafer.

156. (New) An exposure apparatus, comprising:
first exposure means for illuminating a predetermined mask with light of a predetermined wavelength under a first mask-illumination condition, to print a first pattern on a predetermined exposure region; and
second exposure means for illuminating the predetermined mask with light of the predetermined wavelength under a second mask-illumination condition, to print a second pattern on the predetermined exposure region,

wherein a first exposure by said first exposure means and a second exposure by said second exposure means are carried out prior to a development process, and

wherein the light used by said first exposure means for illumination of the predetermined mask and the light used by said second exposure means for illumination of the predetermined mask have substantially mutually orthogonal polarization directions.

157. (New) An exposure apparatus according to Claim 156, wherein, under the first mask-illumination condition, the predetermined mask is illuminated with a first sigma, and, under the second mask-illumination condition, the predetermined mask is illuminated with a second sigma, different from the first sigma.

158. (New) An exposure apparatus according to Claim 156, wherein under the first mask-illumination condition, the predetermined mask is illuminated with a first numerical aperture, and, under the second mask-illumination condition, the predetermined mask is illuminated with a second numerical aperture, different from the first numerical aperture.

159. (New) An exposure apparatus according to Claim 156, wherein, under the first mask-illumination condition, the predetermined mask is illuminated with light being obliquely incident thereon, and, under the second mask-illumination condition, the predetermined mask is illuminated with light being perpendicularly incident thereon.

160. (New) An apparatus according to Claim 156, wherein the mask includes an opening pattern with a linewidth not greater than a resolution limit of an exposure apparatus to be used.

161. (New) An apparatus according to Claim 160, wherein there are plural opening patterns juxtaposed with each other.

162. (New) An apparatus according to Claim 160, wherein the mask includes a phase shift pattern.

163. (New) An apparatus according to Claim 160, wherein there is a desired pattern and an auxiliary pattern having a shape different from that of a repetition of the desired pattern, disposed adjacent to the mask.

164. (New) An apparatus according to Claim 156, wherein the mask is illuminated with light from one of a KrF excimer laser, an ArF excimer laser and an F₂ excimer laser.

165. (New) An apparatus according to Claim 156, wherein the mask is projected by use of a projection optical system comprising one of a dioptric system, a catadioptric system and a catoptric system.

166. (New) An apparatus according to Claim 156, wherein the exposure wavelength of said first exposure means and the exposure wavelength of said second exposure means are substantially the same.

167. (New) An apparatus according to Claim 156, wherein exposures of the exposure region under different illumination conditions are performed simultaneously without interference of lights in the different illumination conditions.

168. (New) An apparatus according to Claim 156, wherein the illumination of the mask is performed with bright field illumination.

169. (New) An apparatus according to Claim 156, wherein the exposure by said first exposure means produces a first region in which an exposure amount does not reach an exposure threshold value, while the exposure by said second exposure means produces a second region in which an exposure amount does not reach the exposure threshold value, and wherein the exposure threshold value is reached in at least a portion of the first and second regions as superposed with each other.

170. (New) An apparatus according to Claim 156, wherein the first and second patterns have different shapes.

171. (New) A device manufacturing method, comprising the steps of:
exposing a wafer to a pattern on a mask by use of an exposure apparatus as recited in Claim 156; and
developing the exposed wafer.

172. (New) An exposure apparatus, comprising:

first exposure means for illuminating a predetermined mask with first light having a first polarization direction, under a first mask-illumination condition; and

second exposure means for illuminating the predetermined mask with second light having a second polarization direction being substantially orthogonal to the first polarization direction, under a second mask-illumination condition,

wherein a first exposure by said first exposure means and a second exposure by said second exposure means are carried out substantially simultaneously, prior to a development process.

173. (New) An apparatus according to Claim 172, wherein said first exposure means is effective to print a first pattern on a predetermined exposure region, and said second exposure means is effective to print a second pattern on the predetermined exposure region.

174. (New) A device manufacturing method, comprising the steps of:
exposing a wafer to a pattern on a mask by use of an exposure apparatus as recited in Claim 172; and
developing the exposed wafer.